CLAIMS

1. A method of maintaining the life of a porous filter when refining a metal metal by controlling the formation of a filter cake thereon, the method comprising passing liquid metal through a porous filter and adding a filter cake formation agent to the metal; contacting the filtered metal with a grain refining agent followed by mechanical mixing to promote intimate mixing of the metal and the grain refining agent to produce refined metal, whereby a filter cake is formed on the porous filter without significant change in the metallostatic head above the filter.

2. A method of maintaining the life of a porous filter when refining a metal melt by controlling the formation of a filter cake thereon, the method comprising passing liquid metal through a porous filter and adding a filter cake formation agent to the metal; contacting the filtered metal with a grain refining agent followed by flow modification to promote intimate mixing of the metal and the grain refining agent to produce refined metal, whereby a filter cake is formed on the porous filter without significant change in the metallostatic head above the filter.

3. A method of refining a metal melt comprising passing liquid metal through a porous filter whilst adding filter cake forming agent to a flow of liquid metal, subjecting the filtered metal to grain refinement by addition of grain refining agent with simultaneous admixing of liquid metal with said grain refining agent followed by separation of at least some particulate matter from the flow of liquid metal characterised in that the liquid metal flow is subjected to only one filtration stage.

4. A method as claimed in Claim 3 in which the admixing of liquid metal and/or separation of particulate matter is effected through liquid metal flow modification.

5. A method as claimed in any preceding Claim, wherein the metal to be refined is a light metal such as aluminium or an alloy comprising aluminium.

6. A method as claimed in any preceding Claim in which the porous filter comprises a ceramic block or plate.

7. A method as claimed in any preceding Claim in which the pore dimensions of the porous filter are in the range of about 300 to about 2,500 micron.

8. A method as claimed in any preceding Claim in which the filter cake formation agent consists of particles coated with substances wetted by the liquid metal and/or containing a fluxing agent such as a fluoride.

9. A method as claimed in any preceding Claim in which the filter cake becomes formed in layers which are non-compressible.

10. A method as claimed in any preceding Claim in which the porous filter is located in one chamber separated from another chamber into which the grain refining agent is introduced.

11. A method as claimed in Claim 10, in which the said chambers are adjacent.

12. A method as claimed in Claim 10 or 11, in which the grain refining agent is fed into the said another chamber countercurrent to the direction of flow of the liquid metal.

13. A method as claimed in any one of Claims 3 to 12, in which separation of said particulate matter is achieved by the presence of baffle plates modifying the path of flow of the liquid metal.

14. A method as claimed in any one of Claims 3 to 12, in which separation of said particulate matter is achieved in means generating swirl flow in the liquid metal, such as within a cyclone.

15. A method as claimed in any preceding Claim, wherein particulates greater than 40 micron in size are substantially removed from the grain refined metal.

16. Apparatus constructed and arranged to carry into effect a method as claimed in any one of Claims 1 to 13 comprising a primary compartment to receive an inlet flow of liquid metal and including filtration means in the form of a porous filter adapted to support, in use, a build-up of filter cake, means for introducing into the said primary compartment filter cake controlling agent and a secondary compartment adjacent to or spaced from the primary compartment to receive a flow of filtered liquid metal and including an inlet for grain refining agent, the apparatus being constructed or incorporating means to cause admixing of the flowing filtered liquid metal with introduced grain refining agent, and further constructed to or incorporating means to separate at least some particulate matter from the filtered and grain refined liquid metal flow after admixture with the grain refining agent, the apparatus being characterised by a single filtration means.

17. Apparatus as claimed in Claim 16, in which the porous filter is located at and defines the base of the metal feed inlet compartment within the primary chamber.

18. Apparatus as claimed in Claim 16 or 17, in which the grain refining agent inlet is angled at an acute angle with respect to the secondary compartment to cause intimate admixture of the grain refining agent with flowing filtered liquid metal.

19. Apparatus as claimed in any one of Claims 16 to 17, including a plurality of baffle plates situated to effect modification to the flow of liquid metal towards an exit of the apparatus.

20. Apparatus as claimed in any one of Claims 16 to 18, including a means for generating swirl flow to induce separation of at least some particulate matter, in use, from flowing filtered and grain refined liquid metal.